

data sets may correspond to words, characters, or character strings in the electronic document, and at least some of the supporting data sets may store potential alternative words, characters, or character strings corresponding to the words, characters, or character strings stored in their associated independent data sets. As above, the potential alternative words, characters, or character strings may be generated by a recognition program or engine, such as a speech recognizer or a handwriting recognizer. The potential alternative characters, words, or character strings also may be generated and/or made available from other sources, such as from spell-checking or grammar-checking programs, from thesaurus programs, from storage of personalization or customization data, and the like.

[0034] If desired, in at least some examples, the supporting data structure may include a separate, expanded version of the electronic document, wherein at least some of the supporting data sets in the expanded version include one or more properties, objects, or other data associated with its corresponding independent data set in the electronic document. The potential alternatives, as described above, may be stored as one or more properties in the supporting data sets.

[0035] Systems and methods according to these various aspects of the invention further may: (a) receive input selecting information from the supporting data set(s); and (b) change the electronic document based on the selected information. Additionally, such systems and methods may receive input changing the electronic document's data structure or the supporting data structure. Receipt of such changes may be used to produce corresponding changes in the other data structure, if necessary, so that the content of the electronic document's data structure and the content of the supporting data structure remain synchronized.

[0036] The supporting data stored relating to content in the electronic document is not limited to potential alternative characters, words, or character strings generated by a recognition program or other alternative data. Any suitable or desired data may be stored and associated with a portion of the electronic document without departing from the invention (e.g., as a property, object, or other data associated with a word, character, or other content in the electronic document). For example, the stored data may include alternatives generated by a spell-checking or grammar-checking program or engine, by a thesaurus program or engine, from storage of personalization or customization data, and the like. As additional examples, the stored supporting data further may include information such as: the language of a word, character, or character string; an identifier of a word, character, or character string source (e.g., a globally unique identifier ("GUID") of the program, input, user, or other source of a word, character, or character string in an electronic document); the original electronic ink data associated with a word, character, or character string; the time of input of the word, character, or character string; spacing data associated with the word, character, or character string; and the like.

[0037] Aspects of the invention also relate to computer-readable media including computer-executable instructions stored thereon for modifying or editing electronic documents in the manner described above, as well as for performing various methods and/or operating various systems like those described above.

III. EXAMPLE HARDWARE

[0038] FIG. 1 illustrates a schematic diagram of a general-purpose digital computing environment that can be used to implement various aspects of the present invention. In FIG. 1, a computer 100 includes a processing unit 110, a system memory 120, and a system bus 130 that couples various system components including the system memory 120 to the processing unit 110. The system bus 130 may be any of several types of bus structures including a memory bus or memory controller, a peripheral bus, and a local bus using any of a variety of bus architectures. The system memory 120 may include read only memory (ROM) 140 and random access memory (RAM) 150.

[0039] A basic input/output system 160 (BIOS), which contains the basic routines that help to transfer information between elements within the computer 100, such as during start-up, is stored in the ROM 140. The computer 100 also may include a hard disk drive 170 for reading from and writing to a hard disk (not shown), a magnetic disk drive 180 for reading from or writing to a removable magnetic disk 190, and an optical disk drive 191 for reading from or writing to a removable optical disk 192, such as a CD ROM or other optical media. The hard disk drive 170, magnetic disk drive 180, and optical disk drive 191 are connected to the system bus 130 by a hard disk drive interface 192, a magnetic disk drive interface 193, and an optical disk drive interface 194, respectively. These drives and their associated computer-readable media provide nonvolatile storage of computer-readable instructions, data structures, program modules, and other data for the personal computer 100. It will be appreciated by those skilled in the art that other types of computer-readable media that can store data that is accessible by a computer, such as magnetic cassettes, flash memory cards, digital video disks, Bernoulli cartridges, random access memories (RAMs), read only memories (ROMs), and the like, may also be used in the example operating environment.

[0040] A number of program modules can be stored on the hard disk drive 170, magnetic disk 190, optical disk 192, ROM 140, or RAM 150, including an operating system 195, one or more application programs 196, other program modules 197, and program data 198. A user can enter commands and information into the computer 100 through input devices, such as a keyboard 101 and pointing device 102 (such as a mouse). Other input devices (not shown) may include a microphone, joystick, game pad, satellite dish, scanner, or the like. These and other input devices often are connected to the processing unit 110 through a serial port interface 106 that is coupled to the system bus 130, but they also may be connected by other interfaces, such as a parallel port, game port, or a universal serial bus (USB), and the like. Further still, these devices may be coupled directly to the system bus 130 via an appropriate interface (not shown).

[0041] A monitor 107 or other type of display device also may be connected to the system bus 130 via an interface, such as a video adapter 108. In addition to the monitor 107, personal computers typically include other peripheral output devices (not shown), such as speakers and printers. In one example, a pen digitizer 165 and accompanying pen or stylus 166 are provided in order to digitally capture freehand input. Although a connection between the pen digitizer 165 and the serial port interface 106 is shown in FIG. 1, in